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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
TADAHIKO FURUTA, ET AL.	: EXAMINER: SHEEHAN, J.
SERIAL NO: 10/019,283	:
FILED: JANUARY 2, 2002	: GROUP ART UNIT: 1742
FOR: TITANIUM ALLOY MEMBER	:

AMENDMENT

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313-1450

SIR:

In response to the Office Action dated September 4, 2003, please amend the application identified above as follows.

Amendments to the Specification begin on page 2 of this paper.

Amendments to the Claims are reflected in the listing of claims which begins on page 7 of this paper.

Remarks/Arguments begin on page 13 of this paper.

AMENDMENTS TO THE SPECIFICATION

Please amend paragraph [0061] at page 14 as follows:

(Currently Amended) [0061] The energy level of the d-electron orbit and the bond order are parameters which are inherent in ~~interstitial (alloying) elements~~ substitutional elements being found by the DV-Xα cluster method.

Please amend paragraph [0063] at page 15 as follows:

(Currently Amended) [0063] Specifically, a model is prepared by using clusters (imaginary molecules in crystals) which correspond to respective crystal lattices, the central ~~interstitial (alloying) element~~ substitutional element "M" is changed, and the state of the chemical bond between "M" and a mother alloy "X" (In the present case, "X" is Ti.) is examined. Then, the DV-Xα cluster method is a method by which alloying parameters, expressing individualities which the "M" working as an alloying component shows in the mother alloy, are found. When it is limited to materials which are mainly composed of transition metals, two parameters, (a compositional mean value of) the energy level "Md" of the d-electron orbit and (a compositional mean value of) the bond order "Bo," are said to be effective in practice.

Please amend paragraph [0064] at page 15 as follows:

(Currently Amended) [0064] Note that the energy level "Md" of the d-electron orbit shows the energy level of the d-orbit of ~~an interstitial (alloying) element~~ a substitutional element "M" and is a parameter which possesses a correlation with the electronegativity and atomic radius of an atom. The bond order "Bo" is a parameter which expresses a degree of

overlapping electron clouds between a mother alloying element "X" and ~~an interstitial (alloying) element~~ a substitutional element "M".

Please amend paragraph [0076] at page 18 as follows:

(Currently Amended) [0076] However, the raw material composition in this preparing step does not necessary agree completely with the elemental composition of a final titanium alloy member. This is because there can be alloying elements which are mingled or omitted in the subsequent member forming step, and so on. Therefore, in such a case, the raw material can be prepared so that the elemental composition of a final titanium alloy member satisfies the above-described $2.43 < Md < 2.49$ and $2.86 < Bo < 2.90$. Note that, as ~~an interstitial (alloying) element~~ a substitutional element, there are niobium, tantalum, vanadium, zirconium, hafnium, and the like, for example, and it is suitable that the raw material can include at least one or more elements of those.

Please amend paragraph [0122] at page 29 as follows:

(Currently Amended) [0122] As raw materials, a commercially available hydrogenated-and-dehydrogenated Ti powder (-#325, -#100), and an Nb powder (-#325), a Ta powder (-#325), a V powder (-#325), an Hf powder (-#325) and a Zr powder (-#325), which were ~~interstitial elements~~ substitutional elements, were utilized. Oxygen, which was an interstitial element, was prepared from the aforementioned Ti powder, which included oxygen, or a high-oxygen-content Ti powder, into which oxygen was included by thermally treating the aforementioned Ti powder. In any case, since it was not easy to control the oxygen content, unless the oxygen content was intentionally adjusted, O could be mingled in titanium alloy to such an amount of from 0.15 to 0.20% by weight as an inevitable impurity.

Incidentally, a high-oxygen-content Ti powder could be obtained by heating the aforementioned Ti powder in air at from 200°C to 400°C for from 30 minutes to 128 hours.

Please amend paragraph [0134] at page 32 as follows:

(Currently Amended) [0134] As a raw material, a commercially available granular sponge titanium (the particle diameter being 3 mm or less) was used. As raw materials for ~~interstitial (alloying) elements~~ substitutional elements, raw materials were used which were made by mixing an Nb powder (-#325), a Ta powder (-#325), a V powder (-#325) and a Zr powder

(-#325), forming the resulting mixture powders with a mold at a pressure of 2 ton/cm^2 and pulverizing these to granules having a particle diameter of 3 mm. In this instance, the compositions of the ~~interstitial elements~~ substitutional elements were adjusted, based on desired samples, by compounding and mixing the aforementioned raw material powders so as to satisfy the above-described parameters "Md" and "Bo."

Please amend paragraph [0136] at page 15 as follows:

(Currently Amended) [0136] Here, the ~~interstitial (alloying)~~ substitutional component raw materials were manufactured from powder-formed substances, because the respective melting points of the ~~interstitial (alloying) elements~~ substitutional elements were extremely high, and because they are likely to cause segregation, so that the quality degradations of the titanium alloy members, which resulted therefrom, could be avoided as much as possible. Note that oxygen being an interstitial element was prepared by O included in the aforementioned sponge titanium.

Please replace the original abstract at page 54, with the attached, single paragraph, abstract.